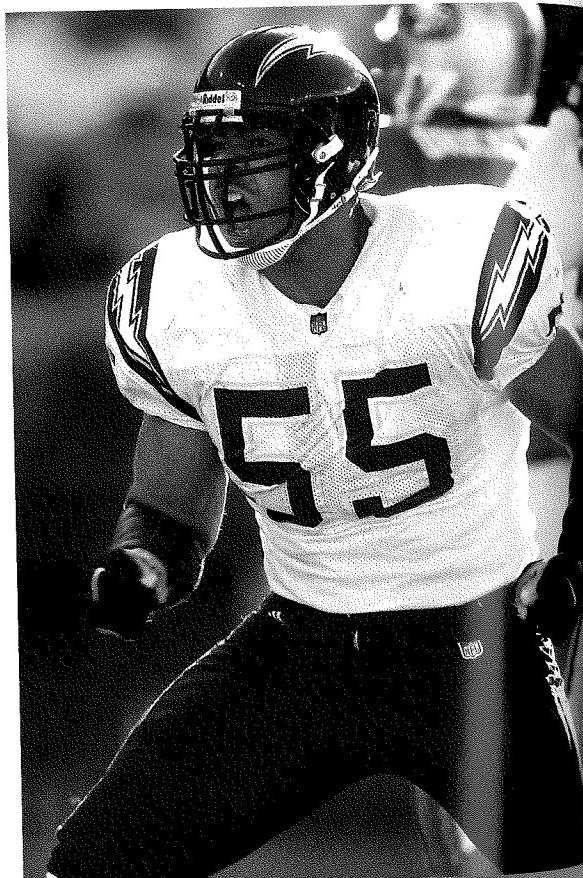


Kevin Guskiewicz, a University of North Carolina neuroscientist and former Steelers trainer, found dramatically higher rates of depression and dementia in NFL players. He compared the formation of the NFL's MTBI committee to an airport security breach.



Junior Seau, one of the greatest linebackers in NFL history, was a San Diego icon. When he killed himself in 2012, several prominent research institutions engaged in an ugly battle over his brain.



NFL, one of the lowest points in the history of the league. The NFL had abandoned Webster to the streets and fought him in court even after he was dead. "I felt like Mike lost his dignity," said Carson. "That's the thing with me that is important."

In 2006, after years of being passed over, Carson was elected to the Pro Football Hall of Fame. He delivered his speech without notes. Standing in the same spot in Canton, Ohio, where Webster, a decade earlier, his mind already riddled with disease, had struggled to gather his thoughts, Carson used the occasion to call out the NFL:

*When I was elected to the Pro Football Hall of Fame, some people asked me, "Why aren't you happy about being elected?" Well, I can't be happy about it until I get one or two things off of my chest, and please indulge me.*

*As a Hall of Famer, I want to implore the NFL and its union to look at the product that you have up on this stage. These are great individuals. The honor of making it into the Hall of Fame is great, but it was even greater to have the opportunity to play in a league with 18,000 individuals. These are some of the best individuals I've ever encountered. We'd get on the field and we'd fight tooth and nail, we'd try to knock each other out, then we'd walk off the field, pat each other on the rear end, and say, "Congratulations, hang in there," whatever. Those individuals I am extremely proud of participating in a game, and it is just a game, I'm extremely proud to have participated in that game with those 18,000 individuals.*

*I would hope that the leaders of the NFL, the future commissioner, and the players association do a much better job of looking out for those individuals. You got to look out for 'em. If we made the league what it is, you have to take better care of your own.*

Carson's speech, coming as the first documented cases linking football and brain damage were revealed, added his powerful voice to the growing list of people calling for the NFL to take action. The setting was symbolic. It had been just a few years earlier that Steve DeKosky, the Alzheimer's expert, had been ignored when he asked the Hall of Fame if

he could study players for signs of neurological disease. Webster himself had viewed the Hall as a sick ward for discarded legends. And now here was Carson, one of its newest members, using his induction speech as a platform to "implore" the NFL and the union to do the right thing. As more and more Hall of Famers became mentally ill, their brains and bodies destroyed, the Canton shrine took on a completely different meaning.

Tagliabue had created the NFL's Mild Traumatic Brain Injury Committee under pressure in 1994. Now, in 2007, the committee's body of work—a veritable fortress of denial—was beginning to crumble. Schwarz, who was brought on full-time by the *Times* shortly after the Andre Waters story was published, was helping to accelerate the process by writing stories that chipped away at the committee's tortured logic. Schwarz and his editors realized that it was far more than one story: The entire sport was in crisis. Schwarz began to look at it from other angles. In one story, he went back to one of the NFL's most controversial pieces of research, NFL Paper Number 7, which concluded that returning to play in the same game posed no significant risk and suggested that "it might be safe for college/high school football players to be cleared to return to play on the same day as their injury." It was an extraordinary statement: The NFL seemed to be prescribing the same aggressive approach for college and high school players, without actually studying them.

Two and a half years later, Schwarz interviewed the authors. Two of the five, Colts neurological consultant Hank Feuer and Cynthia Arfken, an associate professor in Wayne State University's department of psychiatry and behavioral neurosciences who was brought on to conduct the statistical analysis, described the paper's conclusions as unfounded and inappropriate. They hadn't studied high school or college players, and so there was no basis for those claims. Arfken told Schwarz that the controversial "it might be safe" passage had been written into a final draft without her knowledge. Two other authors, Ira Casson and Dave Viano, the same scientists who had attacked Omalu, acknowledged putting in the provocative statement at the last minute to address, they said, comments by peer reviewers who had asked for analysis of the implications for high school and college players. Viano and Casson said both Arfken and Feuer had had a chance to review the final draft.

Feuer, a charter member of the MTBI committee, told the *Times* he

"would change that sentence; I'd eliminate it." Years later, in an interview for this book, Feuer offered the same explanation as Lovell about why information he didn't believe had made it into the paper: He hadn't read it, only the material that was relevant to him.

Arfken had ended up on the paper entirely by chance. She got a call from Viano one day out of the blue; though they were colleagues at Wayne State, they didn't know each other. "He called me because my name started with *A*," Arfken said in an interview for this book. "He just went down the alphabet."

Schwarz accurately described this internal split as "the first crack in a united front long presented by the NFL's concussion committee." Among other things, the story revealed one of the more insidious aspects of the NFL's work: its influence over the national feeder system that funneled elite players into the league. The NFL's science hadn't taken place in a vacuum. Three million kids between 6 and 14 years old played tackle football. There were 1.1 million high school players and 68,000 college players. The NFL's research had been followed by medical personnel who were making decisions involving those kids.

"That was a major disservice, and it continues to be an ongoing one in conversations I have with parents and coaches and players," Gerard Malanga, a New Jersey team doctor for several high schools and colleges, told Schwarz. "They will reference back to that article. It creates confusion when there's increasing clarity on the subject. They say what I tell them about it not being safe to go back in the same game is totally wrong, and they're backed by the NFL. So they go to a doctor who tells them what they want to hear. It's happened. Sure it's happened. And we remain the guys holding our breath that the kid doesn't get hurt again."

The MTBI committee's helmet studies were another example of this trickle-down phenomenon from the NFL's research. The NFL's designs on creating a concussion-resistant helmet had been shot down by the biomechanics firm involved in the project. Lovell and Collins both believed the idea was a fantasy. Yet armed with the flawed UPMC study (coauthored by Lovell and Collins), Riddell, the NFL's official helmet maker, sold about 2 million Revolution helmets, mostly to high school and college players. The company employed an aggressive national advertising campaign that emphasized the Revolution's concussion-reducing

properties, using numbers lifted straight from the Riddell-funded UPMC study—numbers that were both misleading and derived from the flawed NFL research.

Riddell developed PowerPoint presentations to educate its sales representatives on how best to market the Revolution to teams, school districts, and leagues. That material underscored the helmet's "Concussion Reduction Technology," which purportedly reduced concussions by 31 to 41 percent, the sales reps were told. At one point, the company sent out a rush mailer making the concussion-resistant claim for its youth line of helmets. The UPMC study had not examined that line. Realizing that the mailer was false, not just misleading, Riddell's director of marketing modified it by striking one word: "Ground-breaking research shows that athletes who wear Riddell Revolution Youth helmets were 31% less likely to suffer a concussion than athletes who wore traditional football helmets."

The claims had a major impact on the helmet industry. Riddell was able to sell the Revolution at a \$50 premium, which it attributed to the cost of creating the Concussion Reduction Technology and underwriting the UPMC study. One Southern California sporting goods dealer who sold football helmets made by Schutt—Riddell's main competitor—and other brands said the market for non-Riddell helmets in his region had all but dried up. "We just didn't sell many helmets at that point," he said in an interview for this book, asking that his name not be used because he was still in the business. "I think more than anything else, the end user, the dads, were believing what Riddell was saying. And that had a big effect. We were trying to sell the helmets, but if a coach or a dad believes this to be true, they're going to purchase that product."

Schutt modified its helmets to stay competitive. Riddell sued Schutt for patent infringement. Schutt countersued for false advertising and deceptive trade practices. A Wisconsin judge ruled in Riddell's favor. Schutt, the judge wrote, had failed to prove that Riddell's concussion claims were "literally false."

"Although the presentations and internal discussions may suggest that sales representatives were trained to mislead, they fail to suggest that representatives were trained to make literally false statements," the judge wrote.

Do you really understand?

Ted Johnson was a hard-hitting New England Patriots linebacker for 10 years, winning three Super Bowls before his retirement in 2005. When he saw that Andre Waters had been diagnosed with brain damage by Omalu after shooting himself in the head, he decided to tell his own dark story. It was a story both unique to Ted Johnson and now familiar, with echoes of Webster, Hoge, and countless others. Johnson, like Webster, found that he couldn't function without gulping down huge quantities of stimulants, in his case Adderall. His addiction, depression, and self-loathing frequently confined him to his bed, where he lay in the dark for days. He had migraines and memory loss and felt certain he was losing his mind.

Johnson first told his story in 2006 to the *Boston Globe*'s Jackie MacMullan, who was about to publish it until Johnson was arrested for assault and battery for pushing his wife into a bookcase. After the incident, Johnson begged MacMullan to delay the piece; she reluctantly agreed, not wanting to take advantage of a man she thought was clearly unstable. What happened next revealed a lot about not only Johnson but also Nowinski, who was intent on exploiting his budding relationship with the *New York Times* to the fullest. With MacMullan still sitting on her exclusive, she received word that Johnson had given his story to Alan Schwarz and the *Times*. MacMullan was furious at Johnson, who later told her that Nowinski had advised him to spurn her because the *Times* would bring "the best bang for the buck." The betrayal was so audacious that Nowinski's embarrassed colleagues and *Times* editors alerted MacMullan, who, after screaming at Nowinski, scrambled to get her own story published.

The two pieces ran on the same Sunday: February 2, 2007. They were devastating. Johnson traced his problems to a concussion he had sustained in a 2002 preseason game against the New York Giants. Four days after the injury, still groggy, he took the practice field wearing a noncontact red jersey. Before a set of running drills, however, an assistant trainer handed him a blue jersey—essentially an order to get out and hit. Johnson knew right away the switch had been made not by the

team's medical staff but by the Patriots' head coach, Bill Belichick. He feared that if he refused, he'd lose his job and his \$1.1 million salary. "I'm sitting there going, 'God, do I put this thing on?'" he said. He added that such intimidation is common in the NFL. "That day it was Bill Belichick and Ted Johnson," he said. "But it happens all the time."

Johnson got hit in the head on the first play, leaving him dazed. When he reported the second concussion to a trainer after practice, the Pats sent him to Massachusetts General Hospital.

"You played God with my health," Johnson said he later told Belichick. "You knew I shouldn't have been cleared to play, and you gave me that blue jersey anyway."

MacMullan got hold of Belichick. The coach told her that he and Johnson apologized to each other during the air-clearing meeting. He never denied ordering Johnson to wear the blue jersey. "If Ted felt so strongly that he didn't feel he was ready to practice with us, he should have told me," Belichick said.

Rendered in painful detail—Johnson also revealed that he nearly underwent electroshock therapy—the Ted Johnson story read like another real-world counterargument to years of NFL denials. Johnson hadn't returned to play because the Pats' astute medical staff had cleared him; his head coach had ordered him to go out and hit. His first concussion wasn't unconnected to the second; his brain had been primed for further injury. Johnson estimated he'd had as many 30 concussions during his career. Cantu, his doctor, concluded that he had post-concussion syndrome and incipient dementia.

As the voices challenging the NFL proliferated, the league began to respond. It was a little like the scene in *Titanic* when the ocean liner struggles to avoid the iceberg. The league rushed out a series of new policies. The "88 Plan" was established in honor of John Mackey, the legendary Colts tight end, who was experiencing advanced dementia. Mackey, the former head of the players union, sometimes spooned his coffee, thinking it was soup; was unable to recognize people he had just met; and flew into illogical rages distantly connected to his illustrious career. Mackey wore two rings—one from Super Bowl V, when the Colts scored 10 points in the fourth quarter to beat the Cowboys, and one from his induction into the Hall of Fame. In 2006, when airport

security asked him to remove the rings, he became enraged, ran toward the gate, and had to be wrestled to the ground by armed guards, screaming and mumbling: "I got in the end zone!" The 88 Plan, named after Mackey's old number, provided up to \$88,000 a year for players with dementia, Alzheimer's, amyotrophic lateral sclerosis (ALS), or Parkinson's. It originated with a wrenching three-page letter that Mackey's wife, Sylvia, had sent to Tagliabue, describing her husband's condition as "a slow, deteriorating, ugly, caregiver-killing, degenerative, brain-destroying tragic horror." Dozens of applications soon poured in.

The NFL also adopted mandatory neuropsychological testing—providing more business to Lovell, Collins, and ImPACT—and established a hot line for players to report improper concussion treatment by their coaches or trainers. The policy immediately became known as the Ted Johnson Rule.

The league also reconfigured its concussion committee. Pellman, whose résumé embellishment had been exposed two years earlier, was removed as chairman, although he was allowed to stay on as a committee member. Casson and Viano replaced him as cochairs. It wasn't exactly a major shake-up: The triumvirate that had steered the NFL's science for the past 13 years remained intact, just rearranged slightly. The committee added three new members, including Joe Maroon, whom the NFL originally described as a "non-affiliated" doctor. That was quickly amended after it was pointed out that Maroon had worked for the Pittsburgh Steelers for two decades.

There was an odd schizophrenia to the policy changes. The league and the union had created a special fund for players with brain damage while at the same time vehemently denying that football caused brain damage. When Schwarz pointed out this apparent contradiction to Greg Aiello, the league spokesman replied that dementia was a disease that "affects many elderly people." The NFL's criticism of Omalu continued. Casson told the *Washington Post* that Omalu's work was riddled with "glaring deficiencies" and suggested that he had exaggerated his findings.

Casson, the new cochair, baffled researchers and laypersons alike. Even more than Pellman, he would become associated with the NFL's refusal to admit it had a problem—the league's true disbeliever. A bald, combative man, Casson was emphatic: He didn't believe the evidence.

His denials were all the more confounding because of his experience with boxers. Casson's 1982 study in the British *Journal of Neurology, Neurosurgery, and Psychiatry* was regarded as a breakthrough and had been particularly well timed, coming the same year that Duk Koo Kim, a South Korean lightweight, died of a brain hemorrhage after fighting Ray Mancini outside Caesars Palace. Casson and his colleagues performed CT scans on 10 boxers shortly after routine knockouts. Five showed signs of cerebral atrophy. Experience appeared to be a predictor: the more bouts, the more brain damage. Among the five boxers with 20 or more fights, four had cerebral atrophy. Of the five with fewer than 12 fights, only one had it. Rather than a single punch, Casson and his colleagues wrote that "a cumulative effect of multiple subconcussive head blows is the most likely culprit," a fact that, when applied to football, had dramatic implications for the men in the Pit.

The year after his study came out, *Sports Illustrated* brought in Casson as a consultant to examine a CT scan of Muhammad Ali's brain. The scan had been taken in July 1981, before Ali was cleared for his last fight, against Trevor Berbick. "They read this as normal?" said Casson, poring over the scan. "I wouldn't have read this as normal." At SI's request, Casson also performed neurological exams on three other living fighters: the heavyweights Jerry Quarry and Randall (Tex) Cobb and a bantamweight named Mark Pacheco. Quarry and Pacheco had abnormal CT scans and signs of cavum septum pellucidum, a shearing of the ventricles. The exercise foreshadowed the debate about football 30 years later. Casson had become part of a long line of researchers to reveal the devastating effects of the sweet science on the brain. But on the question of whether boxing should be banned, Casson replied no. "A boxer ought to know what he's getting into if he wants to go on and be a champion," he said. "He should know what he may be sacrificing. A doctor has to tell the boxer if he thinks the fighter should stop, but in the end it's not really a medical decision. Society has to decide what we're going to do about boxing."

Casson had studied boxers for decades and had come away with no doubts that the sport caused brain damage. But when it came to football, he wasn't buying it. He later told Congress: "My position is that there is not enough valid, reliable or objective scientific evidence at present to

determine whether or not repeat head impacts in professional football result in long term brain damage." In a 2010 article for *Neurology Today*, Casson quoted Charles Darwin: "False facts are highly injurious to the progress of science for they often endure long." He wrote that Guskiewicz's dementia and depression studies at North Carolina suffered from "inherent methodological limitations," especially a possible bias in how players self-reported their injuries. He wrote that the buildup of tau protein seen in the brains of "a few retired NFL players" was not "exclusive to head trauma." NFL doctors had been treating concussed players "in a cautious and conservative manner for many years," he asserted. Casson concluded: "The public has been led to believe that dementia and depression are a frequent and inevitable consequence of a career in professional football. This 'false fact' is belied by the presence of a large number of retired players who, despite experiencing multiple concussions, have gone on to have brilliant careers in broadcasting and other endeavors."

Cantu, while tearing into the NFL one afternoon at a conference in Las Vegas, described Casson to the audience of 100 researchers as "a neurologist that had studied boxers and should have known better." Guskiewicz came to believe that Casson was the single most destructive force for the NFL during the entire era of denial, worse even than Pellman. "Whoever picked Ira Casson should have been fired before he was fired," said Guskiewicz. Casson, in fact, had been selected personally by Tagliabue, he told Congress and others.

Even people who liked and admired Ira Casson felt that he was his own worst enemy. "Ira is a good man; he just can't keep out of his own way," said Lovell. "So dogmatic. He became a lightning rod. Presentation matters. I think everybody has a reasonable point of view. But when you dogmatically say this is all just like a scam, everybody writes you off. And Ira got kind of written off as a nut. His presentation is such that if you're looking for a villain, you know, he became it."

That April, as the NFL ocean liner was making its groaning pivot, Casson sat down for an interview with Bernard Goldberg, the writer and Emmy-winning TV correspondent. Goldberg, the author of works such as *Bias* and *100 People Who Are Screwing Up America (And Al Franken is #37)*, was also a correspondent on HBO's *Real Sports*. Goldberg was trying to sort out the growing controversy around football and brain

damage. He interviewed Casson, the new cochair of the MTBI committee, to get the NFL's views.

"Is there any evidence, as far as you're concerned, that links multiple head injuries among football players with depression?" Goldberg began.

Casson cocked his head slightly.

"No," he replied emphatically.

"With dementia?" asked Goldberg.

"No."

"With early onset of Alzheimer's?"

"No."

The interview was taking place nearly two years after Omalu's report on Webster and months after the studies on Long and Waters had been published. By then, the NFL had established the 88 Plan in John Mackey's honor. The drumbeat of accounts of mentally disabled players like Ted Johnson kept growing louder.

"Is there any evidence as of today that links multiple head injuries with *any* long-term problem?" Goldberg asked finally.

"In NFL players?" said Casson. "No."

Goldberg said he walked away thinking: "Well, he's pretty sure of himself."

The NFL had replaced Elliot Pellman with a man who from that point forward became known to critics as Dr. No.

**T**he rumors began to circulate that spring of 2007, when so much change seemed to be in the air. The NFL was planning a Concussion Summit, it was said, and even the Dissenters might be invited. "And then sure enough the invitation came by e-mail," Guskiewicz said. "I think we all sort of thought, 'Okay, maybe this is a good sign.' I'll be honest with you. I was a little nervous. You didn't know what to expect."

The NFL had undergone one other major change. Paul Tagliabue had retired after nearly 17 years as commissioner. He was replaced by his right-hand man, Roger Goodell, the league's chief operating officer.

It was hard to ignore how Tagliabue, as he walked out the door, had dumped a mushrooming health crisis in Goodell's lap. "Commissioner Goodell inherited a nightmare, truly inherited a nightmare," said Bob Stern, a Boston University neuropsychologist who soon would become

involved in the crisis. "He inherited a cover-up." Tagliabue, of course, had long shared the MTBI committee's skepticism about the magnitude of the concussion problem. There was no indication that his views had changed. But if anyone was equipped to grasp the huge potential ramifications for the NFL—and the need to change course fast—it was Roger Goodell. After taking office at age 47, Goodell adopted an expression for what he believed was one of his main responsibilities as commissioner: "Protect the shield," he called it, safeguarding the integrity of the game. By then, Goodell had spent more than half his life in the league. He had dreamed of being NFL commissioner since his teens. Goodell's idol was his late father, Charles, a Republican senator from New York who lost his party's support and then his seat after sponsoring a bill to end the Vietnam War. When Goodell graduated from Washington & Jefferson College in 1981, he wrote to his dad: "If there is one thing I want to accomplish in my life besides becoming commissioner of the NFL, it is to make you proud of me." Goodell started his quest to become NFL commissioner from the bottom. He personally wrote letters to Tagliabue's predecessor, Pete Rozelle, and all 28 teams, asking for an opportunity to serve. He landed an internship in the NFL's secretarial pool, where he clipped newspaper articles and fetched coffee for the league's PR department. Goodell was now the most powerful man in American sports.

When Goodell took over the previous September, the concussion issue was not at the top of his agenda. At the time, the primary concern was how to divide the league's expanding riches, which would soon approach \$10 billion a year, and the possibility of an impending work stoppage. The focus had changed quickly with the publicity surrounding players such as Waters and Johnson and the obvious disconnect between their personal stories and the attitude of the league's doctors, articulated most forcefully by Ira Casson.

The Concussion Summit was designed to get the new commissioner up to speed. There had been nothing like it in the history of the NFL. The league would gather all medical personnel—doctors, trainers, neurological consultants—in one room and debate the science of concussions. All the original Dissenters—Guskiewicz, Cantu, Barr, and Bailes—were invited to make presentations. Apuzzo was

the keynote speaker. The attendees were greeted with a large packet of material emblazoned with the NFL's red, white, and blue logo. It included all the MTBI committee's *Neurosurgery* papers on a compact disc, a laminated sheet of "Concussion Information for NFL Players and Family"—Point 1: What is a concussion?—six pages of references to peer-reviewed studies on ImPACT, and even the Guskiewicz and Bailes depression study that the league had shredded.

Omalu—the man who had started it all—was conspicuously left off the invitation list. No one could say why. Bailes was asked to present Omalu's research.

"Why did they ask you? Why didn't they ask me?" Omalu said to Bailes when he first heard about the summit. Here was his opportunity to try to persuade the NFL that he was right, that he wasn't evil.

"I don't know, Bennet," Bailes said.

"He felt like he was being ostracized," said Bailes, who agreed. "It was pretty shocking that Bennet wasn't called. If it was real scientific discourse, they would want to have him there and they would want to pick his brain. You'd want to have *the* source there. Why would you want somebody else? Get him there, put him on the spotlight, like the witness stand, scientifically. Why wouldn't you want to do that? It's the truth."

The daylong meeting took place in a 218-seat amphitheater at Chicago's Westin O'Hare. The audience was composed mostly of white men in coats and ties. Goodell made the opening remarks at 9:15 A.M., emphasizing the NFL's commitment to the concussion issue and thanking the MTBI committee for its work. Apuzzo spoke next. Barr, who by then had developed perhaps the least charitable view of the proceedings, described the presence of the *Neurosurgery* editor—New York Giants consultant as "very strange. To me, it was like whatever pact they signed with the devil about having him publish their findings, he probably said, 'You guys owe me. I want to talk at the conference.' It's kind of embarrassing to have your grandfather get up there when you don't want him to, but that's what it was. He basically said, 'I do this for the Giants and I'll be happy to help any team that needs help with it.' He really conveyed to me he was really just interested in being part of the game in a pathetic way."

Apuzzo gave way to a series of 10- to 40-minute discussions on the

topics of the day. Casson and Viano summarized the NFL's research. Cantu spoke about guidelines for returning to play. Guskiewicz gave a presentation on the risks of returning to the same game. They were all touchy subjects, the source of much of the hostility between the Dissenters and the league, but the atmosphere was civil, even collegial. It could have been any dry medical conference.

Then Bill Barr took the stage. His topic was ostensibly the "Role of Neuropsychological Testing in Return to Play Decisions." But really he had shown up to firebomb the NFL's research. As Goodell looked on, Barr repeated his allegations that Pellman and Lovell had left out thousands of baseline tests in NFL Paper Number 6, the paper that supposedly had shown that players recover quickly from concussions.

"I said that the data collection is all biased," Barr said. "And I showed slides of that. Basically I pointed out that we had been obtaining baselines on players for 10 years, and when you look at the study it only included a small amount of data. My calculations were that their published studies only included 15 percent of the available data. Let's put it this way: There were nearly 5,000 baseline studies that had been obtained in that 10-year period. And only 655 were published in the study."

Barr hadn't come right out and said it, but essentially he was accusing the NFL's researchers of fraud. The implication was that Pellman and Lovell had purposely excluded data that didn't support their findings. Those NFL researchers were in the room. Pellman, after his demotion from committee chairman, had been left off the program but was still on the committee and was seated in the audience. Lovell was still director of the NFL Neuropsychology Program and in fact had also been asked to make a presentation to the group.

Lovell already felt sick—literally. At four that morning, he had woken up vomiting, the result of a seafood allergy that had flared up after he'd gorged himself on crab legs and shrimp at a banquet the night before. "I was vomiting for like five hours," he said. "Then I had to give two presentations in front of two hundred people in this highly charged [atmosphere]. You literally had people sitting on one side of the room and the other." Lovell thought he might not make it. "I was deathly ill," he said. "I didn't think I'd be able to present, and I knew how that would look." Steelers doctor Tony Yates, who was also Lovell's

physician, bailed him out by giving him Zofran, a medication used to treat nausea after chemotherapy.

Lovell recovered enough to present but now found himself under attack in front of the new NFL commissioner. Cantu watched from the audience, cringing. He'd had his own scientific disagreements with Lovell, of course, but he felt Barr's attack was inappropriate. "I really felt badly for Mark because I didn't feel that was the setting to be exposed to all this," Cantu said. Lovell tried to rebut the allegations. He told the audience that he had used all available data at the time of the study and that it was unclear why he might not have received all of the information.

The next scheduled speaker was Joe Waeckerle, a Kansas City Chiefs doctor and member of the NFL committee. Waeckerle was scheduled to present a 10-minute "Editor's View of the MTBI Research," but according to Cantu, Waeckerle instead announced to the audience: "Well, we now have these ethics issues to assess."

The NFL's Concussion Summit had suddenly turned into an informal ethics inquiry, with Lovell as defendant.

At one point, according to Lovell, Barr was asked about the missing data: Did the NFL have them or not?

"Yes," Barr replied, according to Lovell.

Barr said he did provide data to Lovell, but only up to 2000, four years before the paper was published. After that, he said, he was never asked for the information. As a result, the league had only part of his data. He said Lovell and Pellman never set up an organized system to collect all the data that were being compiled by the individual teams. But when the NFL wrote up the study, it implied that the data were comprehensive.

The NFL debated the ethical questions surrounding NFL Paper Number 6 before deciding that Lovell hadn't done anything wrong. "It came down in favor of Mark," said Cantu, who was still uncomfortable with what had just unfolded. "The net effect was he got exonerated in the open forum. But there was enough said before that it just was awkward, to say the least." Barr agreed that the consensus was that Lovell "didn't do anything intentional to not put data in there, but I don't think anybody concluded he did a great job on that research."

As the session broke up, Barr left the stage and made a beeline for

the bathroom. "I had to take a wicked pee," he said. As he walked out of the amphitheater, Micky Collins, Lovell's protégé and partner in ImPACT, followed him outside, fuming.

Collins chased down Barr before he could make it to the men's room.

"What are you doing!" Collins screamed, according to Barr. "You're ruining everything! You're an idiot! Everybody hates you!"

"He got his nose right up in my face, like managers in baseball when they get in the face of the umpire and they want everybody to know they're arguing," Barr said. "I'd never had anything like that before—where somebody is just right in my face."

"Calm down, man," Barr said he told Collins. "Micky, I feel like you're going to hit me or something."

Barr looked down the hallway. Television cameras were hovering nearby. Collins began to calm down, he said.

"You don't understand what we're trying to do," Collins told him. "We're trying to do good."

"Micky, I don't believe in the science you're doing," said Barr.

Collins suggested that he come to Pittsburgh to see how ImPACT really worked.

"Micky, you're talking to me like you're trying to convert me in a religion," Barr said.

"You know what? It is kind of a religion," said Collins, according to Barr.

Collins acknowledged that he had confronted Barr but said he never raised his voice. He said he was upset about Barr's shabby treatment of Lovell.

"Bill, Mark Lovell is the most ethical human being I've ever met," Collins said he told Barr. "For you to attack him is wrong. You look like a buffoon."

He said he never compared ImPACT to a religion. "I would never use that language. That makes it sound like a cult; it's creepy." He said he merely told Barr that people gravitated to ImPACT "because it works."

In many ways, the confrontation had been building for years. It was a product of jealousy over ImPACT's wild success; the tension over the perceived conflicts involving Lovell, Collins, the NFL, and Riddell; and, of course, the allegations over the missing data first aired the year

before by ESPN's Keating. Lovell even believed that his long-ago victory over Barr in the recruiting battle over Collins was a factor.

Regardless, the NFL's Concussion Summit already had featured an ethics probe and a near brawl involving two neuroscientists.

And it was only lunch.

Bailes presented in the afternoon, standing in for Omalu. The topic was "Does Concussion Lead to Pugilistic Dementia and Alzheimer's?" Also presenting were Maroon and Casson. They made quite a trio: Bailes, the genteel and brawny southerner; Maroon, the diminutive triathlete (and Bailes's former boss); and Casson, brimming with certitude.

The presentation was unusual in that Bailes was effectively describing someone else's work. This, too, provided a stark contrast. Omalu—a graduate of the Cyril Wecht School of Theatrical Pathology—was every bit the showman; love him or hate him, you couldn't take your eyes off him. Bailes, by comparison, was a plodding presenter.

It was nonetheless an extraordinary moment. As the NFL commissioner and the league's medical hierarchy looked on, microscopic images taken from dead football players appeared on the screen. Bailes explained that the brown splotches represented brain cells strangled by the tau protein. The almost certain cause, Bailes said, was repetitive head trauma related to football.

As Bailes went through one slide after another, he described the devastating symptoms produced by the disease: depression, dementia, even suicide. It was hard to imagine—the images seemed so benign, like flecks of paint on white marble. It was hard to connect the images to a man drinking antifreeze or knocking himself unconscious with a stun gun. Bailes didn't talk about that. He showed the slides and described what he thought was the cause. "The facts spoke for themselves," he said. "There wasn't really very much editorialization that I had to do. I tried to stay narrow and focus on just what the findings were. Having taken care of brain-injury patients for the previous two decades or more, I knew that the only cause that was known in medical science was this exposure" to head trauma.

As he spoke, Bailes scanned the audience for a reaction. He was

feeling the weight of the moment. The conclusions he was delivering to the NFL and its new commissioner, he felt, were "extremely profound": Their game was causing brain damage. How much wasn't clear. But the results, combined with his own studies on depression and dementia in living players, were ominous. Bailes's gaze fell upon a man seated in the first few rows. As sobering as the news was, he seemed to be . . . *smirking*. Bailes looked more closely. The smirker wasn't looking at him but at Casson, who was standing off to the side.

Bailes turned to look at Casson. "I saw him rolling his eyes," said Bailes. He was stunned. As Bailes delivered his sobering presentation, the cochair of the NFL's Mild Traumatic Brain Injury Committee was mocking him! Bailes had presented dozens of papers and had never witnessed anything like it. Struggling to describe what he felt in that moment, he called Casson's reaction "unprecedented, totally unprofessional, egregious. . . . What other word can I say? It was unbelievable, inappropriate, unbelievable."

Bailes kept going. When he got to the end, he was met with silence. "There were maybe one or two questions," he said. "It was a lack of interest, a lack of intellectual scientific medical curiosity. And absolutely no line to, 'What's the next step?'"

Casson was now questioning Bailes's conclusions, which, of course, were Omalu's. Casson brought up his own experience with boxers and said these cases were definitively not dementia pugilistica as he understood it. The buildup of tau protein could have been caused by many factors, he said, including substance abuse and steroids. "He was really digging in and just totally unwilling to budge, and that was really their view on everything," said Barr, who was back in the audience. "They were like, 'Okay, I'll listen to you, but you're wrong. We gave you a chance to talk today, but you're wrong.'"

"I'm a man of science," Casson declared.

Years later, that was the line that stuck with everyone. Casson repeated it throughout the afternoon as a response to conclusions with which he seemed to disagree.

"I'm a man of science."

The clear implication was that what Bailes had just presented was not science.

Even Collins, who thought Omalu's research was over-the-top, was stupefied by Casson's performance. "I just sat there thinking, 'Why is Ira Casson such an asshole?'" he said.

Guskiewicz was apoplectic. It wasn't that long before that he and Bailes were standing together on the Pittsburgh Steelers sideline—Bailes a young neurosurgeon, Guskiewicz an apprentice trainer. As much as anyone, Bailes had helped launch Guskiewicz's career as a neuroscientist. Together, they had started the Center for the Study of Retired Athletes at a prestigious institution, the University of North Carolina, with the explicit goal of assisting and conducting research on former NFL players. Since then, they had surveyed and examined thousands. Many of the players were fine, Guskiewicz knew. Many were not. Now here was Ira Casson essentially heckling his partner and dismissing all of their work.

Guskiewicz thought the NFL's Concussion Summit had the makings of a *Saturday Night Live* skit, with Casson as the parody of a man in denial.

"Oh, my gosh, as long as I live I'll never forget that day," Guskiewicz said. "I use that as a teaching point with my students. I'm like, 'The day that you have to stand up in front of a group and tell them that you're a man or woman of science, your credibility is shot, especially when you have nothing to put in front of people to convince them.' That was a bad, ugly, ugly day for the NFL."

When the doors flew open, the league tried to put a positive spin on it. A dialogue had been opened. Further research was needed. The league was planning its own study on retired players, which it predicted would bring clarity. "You're looking for an answer," Pellman told Schwarz. "And the answer is there is no answer."

Apuzzo, speaking to a motley collection of football writers and broadcasters, described a concussion as a little-understood "ephemeral kind of event" traceable to prehistoric times, "when people would have a concussion, appear to be dead, and then rise. And what this did was to lead our ancestors in medicine 12,000 years ago to begin to bore holes in dead people's bodies thinking they were going to bring them back to life. So it's a very dramatic thing when that happens." As the editor of *Neurosurgery*, Apuzzo told the sports media, "I really am privileged to feel that I'm a journalist and a part of your family." But he was also the

"principal neurosurgical consultant" to the New York Giants: "I triage the Giant players," he explained.

The NFL seemed to draw a distinction between Bailes and Omalu. Bailes was a reasonable man, the league said. He was at least open to dialogue and debate. Omalu was "out there stating things unequivocally," said Pellman. Goodell also weighed in on Omalu's assertions that the players had brain damage. "I'm not a doctor," he said, "but you have to look at their entire medical history. To look at something that is isolated without looking at their entire medical history, I think is irresponsible."

To Bailes, there was no distinction. He and Omalu were delivering the exact same message: Football causes brain damage. The NFL establishment appeared to have a problem not just with the message but with the messenger, too.

When Schwarz said he heard that the behind-closed-doors exchange got a bit heated, Pellman replied: "I wouldn't even use the word 'heated.' I would use the word 'lukewarm.'"

In fact, the rancor spilled into the ensuing days. Dave Viano, the new cochair of the committee with Casson, tried to get Guskiewicz to sign on to a statement that doubts remained about the effect of repeat concussions. Guskiewicz said the statement was similar to one contained in a pamphlet released to NFL players that fall:

*Current research with professional athletes has not shown that having more than one or two concussions leads to permanent problems if each injury is managed properly. It is important to understand that there is no magic number for how many concussions is too many. Research is currently underway to determine if there are any long-term effects of concussions in NFL athletes.*

"How can you put out this statement? Do you really think you're going to pull the wool over the eyes of these people?" Guskiewicz said he wrote Viano, referring to league medical personnel who had attended the summit. "And he spouted back to me something like, 'That's insulting to me and to our committee that you would suggest that we're trying to pull the wool over anybody's eyes.'"

"Really???" Guskiewicz said he wrote.

"I was just like, 'Come on, get real. Who do you think you're talking to?'" said Guskiewicz. "That was when I realized that he was all about protecting the company, its name, and not about his own integrity. And that's where I lost respect for him. I thought he was one of the few true scientists on that committee."

Guskiewicz detected a faint glimmer of hope right after he left the meeting. He ran into Jeff Pash, the league's general counsel and the number two executive at the NFL. Pash, much to his surprise, was complimentary. "Keep doing what you're doing," he told Guskiewicz.

Guskiewicz came to believe the Concussion Summit was "the game changer, the turning point," but not for the reasons the NFL would cite in the statement he had refused to sign. Guskiewicz realized that Goodell and Pash "were in the back of that room saying, 'I've got a freaking train wreck on my hands here!'"

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## THE BRAIN HUNTERS

**A**lthough neither was invited to Chicago, Omalu and Nowinski had loomed large over the Concussion Summit. It was Omalu's findings, after all, that Bailes had presented. By then, Omalu had linked football to neurodegenerative disease in three dead NFL players: Webster, Long, and Waters. Nowinski had helped put the issue on the national agenda by feeding the Waters story to the *New York Times*. With the league scrambling to regain control over the crisis, Nowinski and Omalu moved to formalize their partnership.

The plan had begun to take shape in January 2007, shortly after the Waters story was published in the *Times*. When things settled down, Omalu wanted to travel to Florida to meet with Waters's family to compile a complete clinical history for his next paper. Nowinski set up the meeting and made plans to join him. Amazingly, the two men still hadn't met face-to-face. They decided to link up at the airport in West Palm Beach and then make the 45-minute drive to Belle Glade to see Waters's family.

Nowinski had seen a picture of Omalu that had run with the story, but the photo was taken from the waist up, Omalu wearing a white lab coat over a tailored light blue dress shirt and a striped tie. He was posed in the middle of a long hallway at the coroner's office in Pittsburgh, staring seriously at the camera. He easily could have passed for 50. When Nowinski saw him in person for the first time, he was taken aback.

"You look much younger than I thought," Nowinski told him. "You look smaller. You look like a college kid."

As they strode through the airport, they made quite a pair: the 28-year-old former Chris Harvard from suburban Chicago, tall, blond, and muscular, and a short, loquacious 38-year-old Nigerian doctor who had earned three degrees and five medical certificates and believed he could talk to the dead.

Nowinski found he enjoyed Omalu's energy and youthful personality. Omalu referred to his faith several times and seemed at ease with his new friend. He discussed a book he was beginning to write about his own experiences with the concussion issue and his battle with the NFL. He asked Nowinski if he would be willing to write the introduction.

As they drove west on U.S. 98, Nowinski broached the idea of forming a partnership with Omalu. He imagined a nonprofit organization based at a research institution that would seek to acquire the brains of dead athletes—primarily football players—and determine if they had CTE. Nowinski, like Omalu, believed the prevalence of the disease was extensive. He had become disgusted by what he viewed as the NFL's pattern of denial. In researching his own book, he had read all the *Neurosurgery* papers and, channeling his mentor Cantu, ridiculed "the NFL's tobacco industry-like refusal to acknowledge the depths of the problem."

Nowinski wanted to fight back against what he saw as a dangerous message. "I knew that if people trusted the NFL implicitly and the NFL leads the sports culture and the NFL didn't take concussions seriously, no one could take concussions seriously," he said.

He wanted to be an advocate for the athletes. He needed someone to carry the science. That would be Omalu's role. Nowinski thought that he and Omalu, along with respected older colleagues such as Cantu and Bailes, could compel the NFL to confront a reality it had spent years dodging. Omalu thought it was a good plan. He, too, liked the idea of directly challenging the NFL, which had tried to discredit the work also was consistent with his faith and a chance to bring some degree of peace and hope to former players and their families.

A few weeks after returning from Florida, Nowinski e-mailed a two-page document to Omalu. It was titled:

#### PROPOSAL TO INSTITUTIONALIZE NEUROPATHOLOGICAL INVESTIGATIONS ON PROFESSIONAL ATHLETES BY AFFILIATING WITH A UNIVERSITY RESEARCH CENTER

The proposal began with a summary of the current state of the research: three cases of former NFL players diagnosed with the "first indisputable evidence" of brain damage caused by football. "This has created a media storm, and may provide the needed momentum to force multiple sports to increase safety measures for athletes, especially at the youth level."

The primary goal outlined by Nowinski was to acquire more brains. He laid out a list of "Current Problems," including no formal process for gathering specimens. In the first two cases, the brains had essentially fallen into Omalu's lap, he noted. The third was acquired "solely on the efforts of one curious researcher"—himself. Nowinski also identified the potential for competition: "This is cutting-edge, groundbreaking, and controversial with real financial consequences for many parties. With the recent media attention surrounding the issue (NY Times, Wash Post), there will likely be new entrants to the field without pure research intentions."

Aligning with a university would give them credibility, Nowinski wrote, which would help as they cold-called families and medical examiners who wondered if they were "credible or crackpots."

Nowinski's two potential candidates to house the institute, both based in Boston, were the Massachusetts Alzheimer's Disease Research Center at Massachusetts General Hospital, which already had a brain bank with 1,000 specimens, and the Harvard Brain Tissue Resource Center at McLean Hospital, which held 6,000 brains. Nowinski noted that separate funding would be needed to pay for a "primary investigator" to find brains and develop an "automated program."

Nowinski and Omalu tossed around names for the organization before settling on the nonthreatening Sports Legacy Institute. They also wanted to come up with a catchier name for the disease itself. CTE was fine as an acronym, but Nowinski and Omalu wanted a name the media and players would embrace. Nowinski e-mailed Omalu some suggestions, trying to work the initials NFL into the disease: necrotic football

linked dementia, neurofibrillar football linked dementia. But Omalu responded: "These names seem too long and do not have that sting to them." Nowinski tried again: (1) Football-induced CTE (FI-CTE), (2) Neurofibrillary Football Linked Dementia, (3) Footballer's Dementia (FD), and (4) Mike Webster's Disease. Later, Omalu sometimes referred to the disease as gridiron dementia.

To give their team additional firepower, Nowinski brought in Cantu, the man who had inspired his activism. "Remember, of anyone that you speak with in this entire business, he can be trusted most of all not to share confidential information or take ideas. He's already The Man," Nowinski wrote Omalu. For his part, Omalu brought in his own champion, Bailes. For legal advice, they added Bob Fitzsimmons, the head coach of Team Webster, who had taken the NFL disability board for \$1.8 million. Barbara Jones, an attorney who had been Nowinski's agent on his book *Head Games*, also briefly came on board.

After the Waters story, Nowinski and Omalu had become sought after, in demand for media interviews and conferences. In late April, two months before the NFL meeting in Chicago, Leigh Steinberg, the agent, had resurrected his own concussion summits from the mid-1990s, aware that his earlier efforts had generated a lot of discussion but little change. The concussion crisis had come full circle. Nowinski and Omalu were invited to make a presentation, as were Cantu, Bailes, and Guskiewicz. Lovell was the only member of the NFL committee to attend. Invitations were sent to the commissioner's office, the NFL Players Association, and owners and trainers from every team. None accepted.

Steinberg excavated some of his material from a decade earlier, describing concussions as "a health epidemic, the consequences of which are a ticking time bomb that may not be seen in their totality for 10, 15 or 20 years." He continued: "What are the stakes? It's one thing to go out and play football and understand that when you turn 40, you can bend over to pick up your child and have aches and pains. It's another thing to bend down and not be able to identify that child."

But it was Omalu who had a far more disturbing story to tell. He put together a PowerPoint slide show for the scientists, players, and media to complement his presentation, "The Neuropathology and Delayed Sequelae of Concussion in NFL Players." If people thought

they were in for a jargon-filled description of neurofibrillary tangles and beta-amyloid plaques, they were mistaken. Omalu opened with a series of autopsy photos. First came Webster, naked from the waist up, right eye open, left eye closed, and Frankenstein-like sutures along each of his arms. Next was Terry Long, also naked from the waist up, eyes slightly open, his tongue drooping out of his mouth. Omalu didn't show Waters only because Waters had blasted a hole in his head.

The pictures shocked many people in the audience, even the scientists who had examined their share of dead bodies. Many felt Omalu had crossed the line. "Some of us knew it was in poor taste," Nowinski said. But Omalu felt this was the nature of his business and an effective way to convey his message. It would not be the last time he showed pictures of dead players in a public setting.

When Nowinski gave his presentation, he used the name for football-induced brain damage that he and Omalu had settled on for the time being: neurofibrillary football linked dementia—NFL dementia.

By then, the newly formed Sports Legacy Institute had its sights on the brain of another player: Justin Strzelczyk (pronounced STREL-zik), yet another former Steelers offensive lineman. Strzelczyk had died two and a half years earlier at age 36 after leading police on a 37-mile chase on Interstate 90 through central New York. The chase concluded with Strzelczyk driving his pickup truck across a median at 100 miles per hour and colliding head-on with an oil tanker. He was killed instantly in the explosion. Strzelczyk had experienced a Webster-like transformation. He had played 133 games over nine seasons in Pittsburgh, retiring in 1998, but by the time of his death had become nothing like the free-spirited, goofy, intelligent man who had been beloved by family, friends, and teammates. Instead, he was paranoid and delusional, devastated by financial troubles and a failed marriage.

Bailes had been with the Steelers when Strzelczyk played; his death, like Webster's, had stunned him. He remembered Strzelczyk as a "fun-loving guy" who would tool around on a Harley, play the banjo, and carry around a bag of candy to distribute to kids "like some modern Santa Claus."

"His death really troubled me," Bailes said.

Now, as the Sports Legacy Institute sought brains, Bailes had a

hunch. He wondered if any of Strzelczyk's brain tissue had been preserved during his autopsy. That led to a call to the medical examiner, who confirmed that he had kept some of the tissue.

Two months later, Schwarz had another story, this one on the front page of the *Times*' sports section announcing that Strzelczyk had signs of "brain damage that experts said was most likely caused by the persistent head trauma of life in football's trenches." Among the experts quoted were Omalu, Bailes, and Ron Hamilton, Omalu's mentor, who had played such a critical role in the validation of Omalu's original work. Hamilton, the story said, had confirmed Omalu's findings on Strzelczyk. He told the newspaper: "This is extremely abnormal in a 36-year-old. If I didn't know anything about this case and I looked at the slides, I would have asked, 'Was this patient a boxer?'"

That story also became the forum for Nowinski, Bailes, and Omalu to formally announce the creation of the Sports Legacy Institute. They couldn't have done it better with a press release. Nowinski described his plan for a nonprofit organization based at a still-unidentified university.

"We want to get an idea of risks of concussions and how widespread chronic traumatic encephalopathy is in former football players," Nowinski told the *Times*. "We are confident there are more cases out there in more sports."

To date, the NFL's efforts to shoot down the theory that football caused brain damage had not gone well. Those efforts included—but were not limited to—demanding a retraction from leading experts in neurodegenerative disease, making public statements in an attempt to discredit independent researchers, and convening a Concussion Summit in which the cochair of the NFL's concussion committee mocked one of the nation's top neurosurgeons in front of the new NFL commissioner as he showed slides of diseased former players.

The NFL needed a new strategy. Ira Casson and his colleagues on the league's concussion committee decided to bring in their own independent expert to examine Omalu's work—if, of course, he was willing to subject it to further scrutiny. The cases already had been validated by numerous researchers, including Bailes, who had been dispatched by the American Association of Neurological Surgeons. Bailes continued to be

shaken by what he had seen. These weren't just case studies that Omalu was presenting; they were human beings Bailes had known personally during his days with the Steelers, people who had spent time with him and his family.

The night of the memorable meeting with Maroon—"Bennet, do you really understand what this means?"—Bailes's wife, Colleen, found him in his basement office, still staring at the slides of Webster's brain.

"This is a sad day for the NFL," Bailes told her.

Bailes had met Colleen in Pittsburgh when he was working for Maroon and she was working as a cardiothoracic nurse in the intensive care unit at Allegheny General Hospital. He knew she would understand. As they sat in the basement, Bailes first showed his wife a slide of a normal brain, then one of Webster's, splotched with the tau protein that had caused him so much pain.

"Here's Mike, our dear friend. Here's his brain," Bailes told Colleen.

She, too, was crestfallen. "For me, it was just really sad to have it come down to a slide of somebody who I knew," she said. "There it was: on a slide. It was just sad. And then he was the first. Little did we know others would follow."

But the NFL still wanted its own opinion. Casson set out to find an independent expert. He didn't have to look far. Casson had an affiliation with Long Island Jewish Medical Center, part of the North Shore—Long Island Jewish Health System. He was aware that North Shore—LIJ recently had opened an Alzheimer's Center. Its director was Peter Davies, a leader in Alzheimer's research. Davies was also recognized as an expert in tau, the protein at the heart of the CTE debate.

Casson contacted Davies and asked if he would assess Omalu's research and report back to the NFL committee. Davies agreed and soon afterward met with the committee at the NFL's headquarters on Park Avenue. Davies told the doctors he couldn't tell much from Omalu's papers in *Neurology*; they showed just one picture from one slide that revealed one neurofibrillary tangle. Davies was baffled and annoyed; he never would have published a paper with so little evidence. He needed to see multiple regions with multiple stains of brain. Davies was skeptical of the finding, and it was clear to him that he wasn't alone.

"I think there was a really high level of skepticism" on the committee,

Davies said. "And in fact, you know, the thought of real exaggeration that [Omalu] was making a mountain out of one picture of a tangle."

"I need to see the tissue that Omalu took the pictures from," Davies told the committee.

Maroon, who had been added to the committee amid the turmoil, volunteered to serve as a liaison. That made sense: He lived in Pittsburgh, knew all the players, and had seen the slides.

Casson offered to pay Davies, but Davies declined. He wanted to avoid even the appearance of a conflict. "If you want my opinion, you'll get what I think, not what you pay for," he told Casson.

A few weeks later, Davies found himself seated in a large conference room at West Virginia University with Maroon, Bailes, and Omalu. By that point, Omalu had obtained brain tissue from six NFL players and two professional wrestlers. Omalu was wary. He saw Davies as a researcher, not a real-world forensic pathologist. He was a scholar, not a doctor. At that point, Omalu wouldn't have trusted anyone sent by the NFL. For his part, Davies saw Omalu as an overzealous coroner slightly out of his depth. The role of a medical examiner was to determine cause of death, not identify new diseases. He thought Omalu's research and staining were crude, not up to his standards. Later, he noted that Omalu, of course, wasn't a neuropathologist. When informed that in fact Omalu was, Davies exclaimed: "Wow, that's surprising! I didn't know that." It wasn't necessarily a recipe for agreement.

Yet the more Davies analyzed the slides, the more astonished he became. It was clear that Omalu was on to something big. Davies confirmed that what Omalu had found was definitely not Alzheimer's or any other disorder he had seen. The pattern of tau was unique, the tangles everywhere.

"It was obvious there was something there," he said. "I knew there was something going on."

Davies wanted to take the tissue back to his lab. He told Omalu that his lab could provide a more exacting level of staining. Omalu panicked. Should he really give up tissue to someone who had been hired by the NFL? But he agreed, telling Davies he would get him whatever he needed.

"I knew if they destroyed my slides, that was a good opportunity for me to sue them and become a multimillionaire," Omalu said.

A few days after the meeting, Maroon, now seemingly a convert, sent Omalu an e-mail of thanks: "The personal effort you made to meet with us is deeply appreciated. Like Socrates, you have been a major 'gadfly' (in a complementary sense) in stimulating and provoking a more detailed examination in the underlying pathophysiology of TBI in sports." One day later, Davies wrote to Omalu: "I remain convinced that you have discovered something, a new phenomenon. . . . This discovery could prove of great importance to the field of neurodegenerative disease research."

Davies kept the NFL committee informed of his progress, forwarding his correspondence with Omalu to Casson and Maroon. At one point, Omalu suggested that he and Davies pursue research together, a suggestion that Davies encouraged. Casson tried to warn him off: "I would suggest great caution regarding Dr. Omalu's proposed paper."

Once back in New York, Davies received the tissue from Omalu. His lab began to process it. The NFL and Casson were eager to hear the conclusions of Davies's study. "Do you have any information regarding your staining of Dr. Omalu's material yet?" Casson wrote. "We are all very anxious to hear about your findings." A few weeks later Casson checked in again: "How is your analysis of the slides going? I am very interested in hearing about your findings." And then, a few days after that: "Dear Peter, I am really looking forward to your report." Omalu, too, was on pins and needles. The early signs had been positive, but he wasn't sure what would come back now that Davies had the material to himself. "Should we expect the results soon?" he wrote.

As Davies peered into his microscope, he couldn't believe what he was seeing.

"I remember that day, you know, it's one of those days where you're just so blown away by what you see: *What on earth am I looking at?*" Davies said. "I've never seen anything like it. With the best stains around, we're seeing far too many tangles. Way too many. More than I've ever seen in anything else before."

The results were so off the charts, Davies thought his technicians

had botched the staining. He had them do it again. That was part of the reason for the delay. When the slides came back, the results were the same.

On January 28, 2009, Davies sent an e-mail to Omalu, beginning to lay out his findings. He was perplexed by one thing. There seemed to be two distinct groups: one with unprecedented widespread disease and the other also with numerous tangles, but not nearly as prevalent. He wondered if there might be a reason other than head trauma for the differences. He began to speculate that perhaps steroids were a factor. Nevertheless, Davies was convinced. The following day he wrote Omalu: "This is amazing stuff: you really have opened a major can of worms!"

Two days later Maroon, still acting as a liaison between Omalu and the NFL, wrote Davies: "I have been asked to comment on this and wondered if you could coach me a little on just where we stand on this. ANY input is appreciated."

Davies wrote back 38 minutes later:

*I am forced to consider at least three different scenarios:*

1. *That Bennet is right, and that repeated head injury produces this pathology, in certain (genetically distinct?) individuals resulting in a very aggressive disease.*
2. *That some systemic factor (steroid abuse?) causes the pathology.*
3. *That the two factors interact such that those abusing steroids become much more sensitive to head injury. Steroids may "prime" neurons for tau pathology following head injury, and render vulnerable whole populations of neurons that otherwise would not show signs of damage.*

When Maroon informed Casson, the cochair of the NFL committee indicated that he thought the findings still didn't implicate football: "WOW!!! Amazing," he wrote Davies. "This seems to raise more questions than it answers. Is it fair to say that something is going on here but it is not clear exactly what that something is?" He again cautioned Davies against collaborating with Omalu and Bailes "until your further studies are completed."

The NFL had brought in its own independent expert, but that expert had muddied the waters further. Davies had validated the magnitude of Omalu's findings. When he issued his final report, he differed only in that he thought some of the cases might have resulted from "either a toxicological or pharmacological cause, rather than traumatic events." That was scientific conjecture; there was no evidence that steroid abuse led to neurodegenerative disease (later, a Bailes study would show that it didn't). Davies also thought genetics might play a role. In light of the extensive history of mental illness in Webster's family, that certainly seemed plausible.

None of it was good news for the NFL. Davies was essentially telling the league it had two issues on its hands: head trauma *and* steroids.

At the time, in light of the way baseball had been consumed by the BALCO steroids scandal while football had stayed under the radar, the steroids scenario wasn't much better for the NFL. "Obviously this wasn't really what the head injury committee wanted to hear," Davies said. Interestingly, once the NFL realized that a steroids problem was in many ways preferable to the suggestion that the sport itself was to blame, committee members and league officials publicly latched on to the steroids theory as the possible cause of neurodegenerative disease.

Davies came away entertained by the experience. He wasn't certain football had caused brain damage in all of Omalu's cases, but it was clear that he had stumbled onto something huge. Casson hadn't gotten what he and his committee expected out of Davies.

"Rightly or wrongly, the perception of that original head injury committee was that they were downplaying the long-term consequences of concussion," Davies said. "Certainly, Ira Casson didn't believe that Omalu was right. And I don't think that anybody on that committee thought that Omalu would come out looking right. When he did, I think there was more of a panic mode, the realization that something was really going on here and it was very serious."

"I was kind of amused at the time. It was one of those things: Be careful what you wish for. You brought me in to find out if Omalu was right, and I said he was right in spades."

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**W**hen Goodell took over from Tagliabue, he couldn't have foreseen how the concussion issue would overwhelm his tenure as commissioner and how damaging the discovery by an obscure forensic pathologist would be for his business. Omalu's conclusion that Webster had brain damage—and the implications that grew out of it—was quickly turning into the defining issue of Goodell's commissionership. After the precipitating event, the scandal continued to spin out in different directions, seemingly with a momentum of its own.

Omalu had become the fulcrum around which most of the action revolved. As the NFL continued to attack him, one of his closest friends, a Pittsburgh personal injury attorney named Jason Luckasevic, asked him one day: "What are you going to do about this?"

"I don't know. What do you mean?" Omalu said.

"Shouldn't you be doing something against the NFL, fighting back or whatever it takes?"

"I don't know. You're a good lawyer; you figure it out," Omalu said.

Jason Luckasevic was even greener than Omalu, a 30-year-old associate at the firm of Goldberg, Persky & White. He had a modest office near Duquesne University, where he had gone to law school. The two men had become friends through Luckasevic's older brother Todd, a pathologist in training at the Allegheny County coroner's office. The Luckasevics were from a sports-obsessed working-class family in the Monongahela Valley; their father was a machinist in a glass factory, and their mother worked at a credit union. Joe Montana had grown up down the street from their grandmother. The Luckasevics had Steelers season tickets and were devoted fans of the Pirates and the Pens. The family loved Omalu—his Nigerian perspective on life, his obvious smarts and religiosity. The Luckasevics invited him over for Christmas every year.

As Jason Luckasevic and Omalu spent more time together, Omalu began insisting that he would make a great expert witness and that Luckasevic should hire him. Luckasevic was dubious, for obvious reasons. Omalu was black, baby-faced, and foreign, not exactly the prototypical expert to persuade a jury to award millions. But Omalu was persistent and persuaded Luckasevic to use him on a major asbestos case. By the eve of the trial, Luckasevic was in a panic. What was he thinking? Omalu had never testified in an asbestos case. The trial was

in a predominantly white rural county 90 miles east of Pittsburgh. He would get creamed.

Luckasevic tried to prep Omalu the night before, but Omalu just wanted to go out for a beer.

"Don't worry, don't worry," Omalu insisted

The next day, when Omalu took the stand, Luckasevic tried to lay the foundation to at least show the jury that his expert witness was qualified.

"Dr. Omalu, you are board-certified in anatomic pathology?" he asked.

"Yes," said Omalu, impeccably dressed, as usual.

"And you are board-certified in clinical pathology?"

"Yes."

"And you are board-certified in forensic pathology?"

"Yes."

"And you are board-certified in neuropathology?"

"Yes."

"And you have a master's in epidemiology?"

"Yes."

"And you're currently attending Carnegie Mellon University to earn your business degree?"

"Yes."

"And, do you have plans to be a lawyer."

"Yes," Omalu said, beginning to laugh, the jury joining in.

The judge finally asked Luckasevic to move on; he had made his point.

"They loved him!" Luckasevic said of the jury's reaction. "We won the case. I mean, it was a huge verdict for Indiana County. It was like almost \$300,000. Ever since then I was a Bennet fan like beyond belief."

As Luckasevic watched his friend absorb repeated shots from the NFL, he grew protective. "Basically, I wanted to have his back as his friend," Luckasevic said. "They're saying that my expert and my friend is a quack, and he wasn't and he isn't. I wasn't gonna let his reputation go down the tubes for the NFL docs saying that there was nothing there."

"Maybe there's something that you can do from the legal side," Omalu suggested.

Luckasevic laughed. He was a lowly associate, spread ridiculously thin, with no time to tilt at windmills. Besides, whom was he going to find that would be willing to take on the NFL in court? And what was the case?

Omalu had a thought: What if you reached out to the families of all the players who had suffered, people like Terry Long's wife, Lynne, and the Waters family, and soon there would be others. Omalu noted that he knew some other potential expert witnesses who had been fighting the NFL for years, people such as Cantu, Bailes, Guskiewicz, and Nowinski. Omalu could make those introductions, laying a chronological history of the issue at Luckasevic's feet.

The young lawyer thought maybe it wasn't so far-fetched. He recognized he would have a long, long road before filing an actual claim, if it ever got to that, but it was *plausible*. In that way, Luckasevic was like Omalu—perhaps too confident and naive to know better.

It was yet another unlikely moment that soon would turn very bad for Big Football—two outraged young friends shooting the shit, thinking about how to sue the NFL.

**A**lthough such a lawsuit was still years away, its potential to wreak havoc unclear, the NFL found itself facing more immediate challenges that were also bad for business. To that point, the league's concussion policies had escaped regulatory scrutiny, but that too was about to change. The mounting press coverage—the steady stream of heartrending stories of former players who felt abandoned by the NFL—caught the attention of Congress, which began to examine the plight of retired players from different angles, putting more pressure on Goodell.

On September 18, 2007, the Senate Committee on Commerce, Science, and Transportation convened a hearing titled "Oversight of the NFL Retirement System." The hearing focused on the overall complaint that the retirement system was broken, that the league had abandoned the men who had built the modern NFL, but concussions and mental illness had become inextricably linked with that story.

One of the first witnesses was Garrett Webster. He had been invited to tell the story of his father's six-year battle with the NFL disability board, which had culminated with the appellate court's lacerating

opinion and a \$1.8 million judgment against the NFL rendered four full years after Webster's death. Garrett used the occasion to provide the Senate Commerce Committee with a sordid recounting of Webster's life after football. He asked if anyone in the room had any idea what it was like to shock one's father with a Taser to alleviate his pain; or if they had experienced receiving a desperate phone call from their dad, saying he was about to kill himself to escape the unending torture; or if they had watched a "once-proud, strong man" like Mike Webster beg for Kentucky Fried Chicken. But it was Garrett's story about how his father missed his tenth birthday without so much as a phone call—a man who once called him practically every night before bed—that left everyone in the room pondering the future of pro football.

"Later that month I found out why," Garrett told the rapt committee members, "when our family discovered Iron Mike Webster, bloated to over 300 pounds, shivering naked in a bed in a rat-infested motel, and at his side were not pictures of his kids, nor his Super Bowl rings, nor autographs or any glory that you associate with football, but a bucket of human waste, because he was too weak to make it to the bathroom."

Garrett was followed by a former player, Brent Boyd, who had played six seasons as an offensive guard with the Minnesota Vikings before retiring in 1986. Boyd had been looking forward to the opportunity to testify. It was a chance to tell the nation's policymakers, and by extension the public, his story.

"I do have brain damage," Boyd began. He asked the committee to please indulge his "invisible disability," which most affected him when he was under stress. Boyd explained that he had been diagnosed with football-induced brain damage in 1999. He said that he had been advised by a member of the disability board not to bother filing a claim because the NFL owners "would never open that can of worms by approving a claim for head injury."

The NFL's schizophrenic policy on concussions was beyond confusing at this point. The league had set up the 88 Plan for retired players with dementia, and the retirement board had distributed benefits to at least *some* players with brain damage. Yet its official concussion committee, cochaired by a neurologist universally known as Dr. No, continued to deny the connection between football and brain damage while

players like Brent Boyd testified under oath about what they perceived as a conspiracy. Boyd likened the NFL to the “tobacco companies fighting against the link between smoking and cancer.” He alleged that the NFL had destroyed his medical files. His disability claim, he said, had been denied by the board even though multiple doctors supported it.

One man took particular issue with Boyd’s testimony. His name was Dave Duerson, and he was also a witness that day. Duerson had spent 11 seasons as a defensive back in the NFL, mostly with the Chicago Bears. He had earned a reputation as one of the game’s fiercest hitters. After retiring, he became a highly successful businessman, so popular in Chicago that local power brokers recruited him to run for office. During his playing days, Duerson was a player representative and took the job seriously—an extension of a childhood that included standing in picket lines with his father, who spent 38 years working for General Motors and was active in the United Auto Workers. Duerson had been one of the named plaintiffs in a federal lawsuit that led to free agency in the NFL. After his final season, he stayed active with the union, eventually becoming so close to its director, Gene Upshaw, that some people viewed him as an heir apparent. Upshaw made Duerson an alternate trustee on the disability board, and Duerson eventually became a voting member on disability claims such as Brent Boyd’s, although it wasn’t clear how he voted in that case.

During the question-and-answer period, Boyd testified that NFL players were never warned that concussions could destroy their lives.

Duerson came to the league’s defense. There was no indication, he said, that football caused brain damage. His own father, he pointed out to the committee, “has Alzheimer’s and brain damage, but never played a professional sport. So, the challenge, you know, in terms of where the damage comes from, is a fair question. . . .”

Duerson’s defense of the NFL infuriated his fellow former players. They found his argument—that his father had brain damage but hadn’t played in the NFL—bizarre and another indication that he was a sellout, protecting the interests of the league. When Duerson walked out into the hallway after his testimony, he got into a screaming match with Hall of Fame linebacker Sam Huff and Bernie Parrish, a former Cleveland Browns defensive back. Both players were critical of Upshaw, Duerson’s

mentor. “Duerson was spewing profanities at Huff and Parrish,” Boyd told the writer Irvin Muchnick, who ran the blog Concussion Inc. “He said, ‘What the fuck do you know about the players union?’ He was acting like he wanted to fight them physically.” Parrish said he accidentally bumped Duerson during the melee, but Duerson “thought it was intentional.”

Duerson had been charged with assaulting his wife in 2005 and, more recently, had run into financial problems. But to most people who knew him, screaming at a pair of respected former players in the halls of Congress wasn’t like him. It seemed an extreme reaction, out of character.

No one had yet put it together that Dave Duerson—defender of the NFL, denier of football-related brain damage—was also losing his mind.

**PART THREE**

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**RECKONING**

## THE ART OF DISEASE

One weekend in June 2007, Chris Benoit, a 220-pound professional wrestler known as the Canadian Crippler, strangled his wife, smothered his seven-year-old son, and then hanged himself from the pulley of a weight machine at his home in suburban Atlanta. Details of the double murder-suicide spilled across the tabloids for weeks. Benoit, from Montreal (his name was pronounced Ben-WAH), left Bibles next to the bodies. Hours passed between the murders, during which Benoit sent cryptic text messages to coworkers with World Wrestling Entertainment, which alerted the police. Steroids were found inside Benoit's home, leading to speculation that he had committed the murders during an episode of "roid rage."

"I knew him well—nicest guy, plenty of concussions," wrote Nowinski, the wrestler formerly known as Chris Harvard, in an e-mail to his new colleagues at the Sports Legacy Institute. Nowinski had his own theory about what had caused Benoit to snap. The Canadian Crippler, he recalled, routinely allowed himself to be hit in the back of the head with a chair and often launched himself from the ropes, landing head-first on his opponent or the mat. Within days of the murders, Nowinski was on the phone to the medical examiner and Benoit's father to secure his brain for SLI.

Shortly afterward, an ESPN crew showed up at Omalu's Pittsburgh condo for a story on Omalu and Nowinski—the odd couple suddenly

giving the NFL fits. As they waited for Nowinski to arrive, the producer, Arty Berko, chatted up Omalu.

"I bet you would love to be involved in the Benoit case," Berko said. Omalu smiled. "Can you keep a secret?" he said.

He led Berko to his hall closet. Tucked in the corner, beneath the winter coats and the umbrellas, was a large pail. It looked to Berko like a five-gallon paint bucket you'd pick up at the Home Depot. A towel was draped over the bucket. Omalu pulled it back to reveal a large piece of Chris Benoit's brain floating in a shallow bath of formalin. Omalu explained to Berko that he and Nowinski had driven to Atlanta days earlier to pick up the brain. Omalu planned to cut it up and study it once it hardened.

"It sounds like you guys had a busy weekend," Berko said to Nowinski after he arrived.

"What are you talking about?" Nowinski asked.

"I heard you're just back from Atlanta. Bennet showed me what's in the closet."

Nowinski was furious. "He wanted to kill Omalu," Berko recalled. The producer tried to persuade Nowinski and Omalu to let him report that they were studying Benoit's brain, but they refused. Nowinski didn't want to risk alienating Benoit's father with the disclosure, he said.

The Sports Legacy Institute had bigger plans for Chris Benoit's brain. After Omalu pulled it out of the closet, he found that it indeed was riddled with CTE. SLI used the diagnosis to further raise its national profile. Benoit wasn't a football player, but the case was consistent with the vision Nowinski had mapped out in his bullet points: to examine all athletes involved in contact sports. The organization hired a PR firm, Widmeyer Communications, which staged a press conference in New York to announce that Benoit had the same kind of brain damage that had been found in NFL players. That was followed by a round of national TV interviews, including a memorable appearance on *Larry King Live*. Benoit's father, choking back tears, told King the diagnosis was a revelation: "Larry, we were searching for answers. The world was black." But who would represent the Sports Legacy Institute? Larry could take only one brain researcher. The two neurosurgeons, Cantu and Bailes, bickered over who would get to do the *Larry King* interview.

Cantu prevailed on a coin flip, but like the flare-up at Omalu's condo, the tiff was another disharmonious sign for SLI.

To the outside world, the nascent research group, the first of its kind, looked like a natural alliance. The ESPN piece would portray Omalu and Nowinski as underdogs raging against the NFL machine. Omalu was shown cutting up brains. Nowinski pumped iron. The two men—one big and white, the other small and black—strode side by side, united. "The NFL has tried to discredit the work that Bennet and I have done, which has been pretty disappointing," Nowinski told ESPN reporter Steve Delsohn. "I wonder how many of these cases we're gonna have to put on their lap before they start taking it seriously." Nowinski tossed another grenade at the league: "I guess what we're dealing with is the issue that 32 billionaires are worried that they're gonna have the values of their franchises drop or that the game won't be as popular or else the players are going to start suing."

But when the cameras were off, SLI wasn't big enough to accommodate so many egos. The tension started with Nowinski and Omalu. Almost from the beginning, when Nowinski remarked offhandedly that Omalu looked younger and smaller than he expected, the relationship had foundered. Nowinski wanted a partner who was polished and reasonable enough to take on the NFL. He quickly determined that Omalu wasn't that person. He found him "unpredictable" and tactless, a feeling that was reinforced when Omalu revealed that he was keeping Chris Benoit's brain in a bucket in his closet or flashed pictures of Webster's corpse during meetings. "The seeds were planted early on that he wasn't going to be the right guy to carry the torch and be able to go toe to toe and stand up against the NFL or any other critic," said Nowinski.

For his part, Omalu came to see Nowinski as a condescending opportunist whose criticism about his ability to stand up to the NFL was laughable considering that Omalu already had withstood two years of attacks by the league. Moreover, Omalu was a licensed neuropathologist with three degrees and five board certifications. Nowinski, his concussion book notwithstanding, was a former pro wrestler and college lineman with a bachelor's degree in sociology. Omalu thought there was a whiff of racism about Nowinski's assessment of him. During their first

meeting in Florida, he recalled, Nowinski told him: "You have a believability factor."

"He said that because I was not white and I was from Nigeria," Omalu said, "that Nigeria's not known for any breakthroughs, that I'm not an established scientist from an Ivy League school, that people are less likely to believe me."

Nowinski, though, said his issues with Omalu had nothing to do with race or culture. It was simply that Omalu was a "risk that needed to be managed."

From that crack in team unity, SLI began to split apart over a variety of issues, most of which revolved around money and control. Nowinski thought the Omalu Group lacked a cohesive plan. Fitzsimmons and Bailes were pushing hard to base the organization at West Virginia University, where Bailes still worked. Nowinski and Cantu thought Boston University was a much better fit, and they came to believe Bailes and Fitzsimmons were bullying them into going with West Virginia. "We were \$150,000 in debt with no way of getting out of it, and I didn't understand what the game plan was," Nowinski said.

The members of the Omalu Group thought they understood Nowinski perfectly: He wanted to use their research—research he was unqualified to do on his own—to make himself rich and famous. The more they watched Nowinski try to seize control, the more resentment they felt. Bailes was one of the top neurosurgeons in the country. Omalu had discovered CTE in football players. Fitzsimmons was one of the most prominent lawyers in the Ohio Valley, the man who had beaten the NFL in court. Who was Chris Nowinski?

"There kind of was a feeling that the thing really was about Chris Nowinski, as opposed to the science and the research," said Fitzsimmons.

It all came to a head during a pair of conference calls with the founders. The group still hadn't resolved where to base the organization. Nowinski, meanwhile, was pressing to be compensated for his efforts. Fitzsimmons asked Nowinski how much he wanted. Recollections of the number Nowinski proposed varied between \$110,000 and \$160,000 a year. Nowinski told the group that he wanted to be paid retroactively to when SLI was formed.

Fitzsimmons laughed at him. "This is crazy," he told Nowinski.

The Sports Legacy Institute, which Fitzsimmons had helped fund with \$10,000 of his own money, was broke, indebted from the public relations campaign and the creation of a website. Fitzsimmons had no interest in putting the fledgling organization deeper in the hole. Bailes, too, began to object, but Nowinski "shut him down," according to Omalu. Nowinski suggested that Omalu was trying to shape the organization according to his own agenda. When Omalu started to protest, Bailes snapped: "Bennet, you don't have to explain yourself to Chris Nowinski."

Fitzsimmons had heard enough.

"I'm resigning," he said. "Good luck to you guys." The next sound they heard was a click. Bailes hung up, too. Omalu stayed on the line, chastising Nowinski for his impertinence to the two distinguished men.

Nowinski later said he and Cantu effectively ousted Bailes and Fitzsimmons from the new organization after deciding that "SLI would have a greater chance of success" without them. Nowinski said his salary demand was "a bluff" to test "their vision for who was going to lead this thing. It was, 'They're not looking out for me at all. If they're not worried about how I make a living, then there's nothing to [talk about].'"

It was an exit strategy, and it worked. Nowinski already had located another neuropathologist, someone who better met his criteria to "carry the torch" and be able to "go toe to toe" with the NFL. Not long after Bailes and Fitzsimmons resigned, Omalu said he received a call from Nowinski telling him he was no longer needed to analyze brains for SLI. Nowinski denied ever making such a call.

"Who are *you*?" Omalu said, incredulous. He said he found it hard to believe the source of the message, a layman who not long ago had called to ask for his help—or, as Omalu would put it, "this mother-fucker who was begging me to talk to him."

Within a year, Nowinski had merged SLI with the Boston University School of Medicine to form the Center for the Study of Traumatic Encephalopathy. When that organization's website was created, it featured a history titled "Our Story." SLI was described as a "non-profit organization that was founded on June 14, 2007, by Christopher Nowinski and Dr. Robert Cantu in reaction to new medical research indicating that brain trauma in sports had become a public health crisis."

Omalu, Bailes, and Fitzsimmons found themselves erased from

history, as if they'd fallen victim to a coup. There was no mention of Bailes's labors or Omalu's research or even Fitzsimmons's \$10,000 that had helped launch the organization that was now based in Boston.

To the world at large, the power struggle would have been unremarkable except for the consequences: It would determine who owned the issue of football and brain damage, a subject that continued to pick up steam.

The NFL was playing defense. Goodell's Concussion Summit in Chicago had been a disaster. Behind closed doors, the conference had only widened the chasm between the league and the Dissenters; publicly, it offered choreographed platitudes and nothing more. Coaches and parents were beginning to express concerns about the implications for youth sports. The specter of a lawsuit had suddenly become very real. When Nowinski and Omalu banded together to form the Sports Legacy Institute, they created an organization that would serve as a national voice for an issue that touched millions of Americans. Now divided, the two men and their associates were left to compete over attention, money, and brains.

In this respect, Omalu, Fitzsimmons, and Bailes had badly underestimated Nowinski. The savvy young activist had them outgunned. Through his relationship with Alan Schwarz, Nowinski had a direct pipeline to the *New York Times*, the most influential newspaper in the country. In Cantu, he had the support of the nation's preeminent concussion expert, a doctor with vast reserves of historical knowledge and an intimate understanding of the NFL's flawed research. Nowinski's alliance with Boston University was a masterstroke. It gave him instant credibility and access to the university's resources, including money and personnel.

Nowinski had made the connection through Bob Stern, a professor of neurology and neurosurgery at BU who also served as codirector of the school's Alzheimer's Disease Clinical and Research Program. Nowinski asked Stern if he could come by his office one afternoon to explain his new endeavor: an organization focused on athletes, especially football players, who appeared to have a form of dementia. Listening to Nowinski talk, "I had this gigantic reaction: I said, 'Oh, my

*God,'*" Stern recalled. Stern found it "unbelievably fascinating from a public health standpoint, because if that's the case, football as we know it is going to be in trouble. And number two—and I think what turned me on most—was this is a disease that hasn't really been looked at. It immediately dawned on me that here's something that was a lifetime of research."

As the project began to gel, one key ingredient was missing: Nowinski needed someone to examine brains. In other words, he needed another Omalu. Stern could help there, too.

"Have I got a neuropathologist for you," he told Nowinski.

Her name was Ann McKee. Stern knew her from the Framingham Heart Study, a legendary project launched by BU and the National Heart Institute in 1948 to study heart disease in Framingham, Massachusetts. The study had continued through generations, branching out in different directions. McKee had studied the brains of Framingham patients after they died in an effort to map the origins of Alzheimer's disease. She had spent the previous two decades studying the intricacies of the tau protein, trying to figure out how the tangles first begin to form in Alzheimer's patients.

If Hollywood talent scouts set out to create a reality series on the search for football-related brain damage, they would start with Ann McKee. She was in her fifties, with blond hair and blue eyes, a Green Bay Packers nut from Appleton, Wisconsin, with a girlish giggle and a knack for making the brain accessible and fun. Describing how she removed the brain for study, McKee would say: "The brain is very delicate. You can't just pull it out or yank it out like sometimes you do with those other organs. You have to really deliver it. I mean, we deliver it like we deliver a baby." Seeing a fresh brain for the first time is "always a little bit like Christmas or your birthday," she said. "It's like, 'What do we have *here?*'" Watching the telegenic McKee slice into a formalin-fixed brain was a little like watching Rachael Ray carve up a cured ham.

McKee hailed from the sporting heartland of America. In 1986, *Sports Illustrated* dedicated 33 pages to Appleton in a search for the "essence of sport in mid-sized American towns." Appleton was "a town without a major league team or a major league garbage strike, a town that breathes clean air, sips fresh lemonade, does its shopping downtown

and, with considerable relentlessness, pursues recreation when the workday is done." McKee was not an athlete, but she was surrounded by them. Her father had played football at Grinnell College. Her older brother Chuck, whom she idolized, had been a three-sport athlete who turned down a scholarship at Wisconsin because he didn't want Division I football to distract him from becoming a doctor. He played quarterback at nearby Lawrence University, leading the Division III school to consecutive conference titles and earning All-America honors. McKee had been a cheerleader at Appleton East High. A tomboy, she played backyard football with her siblings and served as their regular punching bag. "Oh, Annie has her tough clothes on," the boys would announce, and then pounce on their baby sister.

McKee attended Wisconsin at a time when the university was the Berkeley of the Midwest, the heart of the region's counterculture movement. "I embraced it!" said McKee, laughing. A painter, she majored in art and married a musician. Neither her major nor her marriage lasted very long. She decided to follow her brother and become a doctor, enrolling in medical school at Case Western Reserve University in Cleveland. It was there that McKee developed her love of the brain. She found it endlessly fascinating, the source of all humanity. Everything else in the human body was "other stuff"; skin was facade. During autopsies, McKee liked to point out, "the face is actually inverted. That's a shock because everyone thinks their face is really, really important. But our face is just a layer of skin that you can actually roll down. And then you see the bony skull exposed, and you cut the skull and you lift off the skullcap, like a bowl. And then there's the brain: pink and gooey and gelatinous. It's kind of soft. If you poke it, you know, it's not rigid. And it's hard to believe that thing is what's controlling all this other stuff, that gooey, kind of pink thing. That's a real shock, I think."

McKee gravitated to neuropathology. She saw a connection between her interest in art and the patterns of brain disease. When she looked at the spread of tau, the tangles that strangled brain cells in the protein's destructive march, she couldn't help but admire it. She used words like *pretty* and *lovely* to describe the infinite patterns that tau formed, its "beautiful involvement" with neurons, even while recognizing the stark

contrast between the disease's visual appeal and the havoc it wreaked on a person's life. "I was a fanatic about tau," McKee said.

That made her perfect for Nowinski. McKee would have a unique understanding of CTE, a tau-based disease, but she was the anti-Omalu. Omalu couldn't tell the Super Bowl from a cereal bowl, but McKee's entire life was steeped in football. Appleton is about 30 miles southwest of Green Bay, and McKee, almost by osmosis, had become a lifelong Packers fan, parking herself in front of the set every Sunday wearing an Aaron Rodgers jersey and a cheesehead. McKee also worked for the Department of Veterans Affairs. Her cluttered office at the redbrick VA complex in Bedford, Massachusetts, outside Boston, was filled with Packers memorabilia; she kept a Brett Favre bobblehead doll on her desk.

During her Alzheimer's studies, McKee had stumbled across a case involving a former boxer with dementia pugilistica. "I've been looking at oranges for years, and all of a sudden it was like, this is a banana," she said. "It was just thrilling." Later, she came across a fascinating presentation by Steve DeKosky, a fellow Alzheimer's researcher. It was the Webster case: "Chronic Traumatic Encephalopathy in a National Football League Player." McKee was jealous. She didn't recognize the principal author, Omalu, but the case fit the same pattern she had seen in the boxer. "I was really wishing I had that case," she said. She thought she could do better.

"Sorry!" she said, smiling sheepishly. "That's just my own . . . I thought I could do a much better job of lining up the pathology and really understanding it."

She looked for other cases, but they were hard to come by. Until now. Out of the blue, here was Chris Nowinski, telling McKee she could probably have as many Christmases as she wanted. Nowinski said he would go out and get the brains for her. McKee found him "handsome" and "impressive," a man of action around the same age as her kids. She couldn't believe her good fortune. She was fascinated by this area of research, and it involved football, a sport she loved. The players were her heroes. She might be able to help them, she thought.

"Yes! I would *love* to do that," McKee told Nowinski. She thought it was "like the greatest collision on earth."

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**N**owinski got McKee her first brain in February 2008. It belonged to an ex-linebacker named John Grimsley who had played in the NFL from 1984 to 1993, mostly with the Houston Oilers. Grimsley had a reputation as a hard hitter with a mean streak, the prototypical linebacker. When he retired, he launched World Class Expeditions, a company that organized hunting and fishing trips to places such as Texas, Mexico, and Argentina. For a time, Grimsley's business thrived, as did his relationship with his wife and his two sons. Then he began to lose his mind.

About a decade after Grimsley left the game, his wife, Virginia, who had been with him nearly 25 years, started noticing changes in her husband. First came short-term memory problems—forgetting why he went to the store, renting the same movie over and over. Then came the mood swings—anger and irritability. Grimsley always had been easygoing, relaxed with his family; now he would lose his temper without any warning or provocation.

The light bulb went off for Virginia Grimsley in May 2007. She and her sons happened to watch the HBO segment on football and brain damage that became famous for Ira Casson's denials, turning him into the NFL's Dr. No. But Virginia was less interested in what the NFL thought than in the description of the addled former players and their symptoms. "Mom, Dad is doing that already," her sons told her, and they were right.

Nine months later, Grimsley was dead at 45. He had shot himself in the chest. Police ruled it an accident. It appeared that Grimsley had been cleaning his pistol. Virginia told the *Houston Chronicle* that her husband, although he ran hunting trips for a living, had bought a new handgun with which he wasn't familiar. "Anyone could tell you that John would not take his own life," she said. "He was a happy guy. We had no financial problems, no marital problems, and the kids were doing well."

Two days later, Nowinski called.

When McKee got hold of Grimsley's brain, she was excited. Here finally was her chance to see for herself what was going on with these football players. Despite the previous studies on CTE, she needed to

be convinced. "I trust my own work more than any other person's," she said. As she processed the brain, staining it for tau, she had no idea what it would look like. She thought the results might be inconclusive, reveal some other disease, or prove to be nothing at all.

Still, McKee was unprepared for what she saw when she peered into the microscope. She was stunned. This was the brain of a 45-year-old man, far less mature than the brains she typically saw in the Framingham Study. There was tau everywhere, "like disease on steroids," but unlike Alzheimer's, there was no trace of beta-amyloid, one of the main components of that disease. McKee would never forget that moment. In that respect, she was like Omalu, Hamilton, DeKosky, and Davies when they got their first glimpse of CTE. All had the same reaction. "It was like a scientific discovery," she said. "You feel like, 'Oh, my God!'"

Her first call was to her brother Chuck, the doctor. He had a family practice in Wisconsin and also was working as team physician at Lawrence University, his alma mater.

"You won't believe this," she told him.

She explained the disease she had found in John Grimsley's brain—the brain of a nine-year NFL veteran. It looked just like dementia pugilistica, she told her brother. The brain was riddled with disease, and he was just 45! Chuck's response would stick with McKee for years: "This is going to change football," he told her.

For his part, Chuck remembered not his own response but that of his sister, who seemed to grasp immediately how the news would be received. McKee didn't know Omalu and hadn't seen the NFL's attack on him, yet she sensed that many people would not be happy with her. "I think she had this feeling of, 'Oh, there are going to be a lot of people who really don't want to hear this and are going to be upset,'" said Chuck.

The case marked the coming out of Nowinski's reconstituted Sports Legacy Institute. Schwarz broke the story in the *Times*, revealing not only that SLI would announce the Grimsley findings at a press conference the next day but that the organization had established its own brain bank with Boston University. A dozen athletes, including six former NFL players, had pledged to donate their brains to SLI/BU upon their deaths. Among them was Ted Johnson, the ex-Patriots linebacker who had alleged that Bill Belichick had "played God" with his health.

Johnson told Schwarz: "I'm not trying to reach up from the grave and get the NFL. But any doctor who doesn't connect concussions with long-term effects should be ashamed of themselves."

The NFL, meanwhile, announced that its own study of the long-term effects of pro football probably would come out in 2010—16 years after the Mild Traumatic Brain Injury Committee was formed.

**A**s Nowinski and his eager new neuropathologist were making news on the disease that Omalu had discovered in football players, Omalu was in Lodi, California, examining brains in his garage.

Omalu had beat a hasty retreat from Pittsburgh, a city he loved, after a Shakespearean drama that found him testifying in court against his mentor and father figure, Cyril Wecht. The celebrity pathologist had been indicted on 84 counts of abusing his position as Allegheny County coroner. Omalu became a star witness for the prosecution because Wecht, among other things, was charged with using his office to conduct private medical consultations and autopsies for personal gain—the same autopsies Omalu had performed for \$300 a case, while Wecht, Omalu alleged, earned \$5,000–\$10,000.

Omalu was thrust into an impossible situation: He could testify for the government—and against the man he idolized—or he could refuse and face the possibility of being deported or even indicted.

"I was scared shitless," Omalu said.

Wecht understood Omalu's predicament—to a point. "His ass was going to be sent back to Africa; you know the way the feds work," he said. Omalu understood that Wecht didn't want him to testify. "He believed I should have sacrificed myself for him," said Omalu. Feeling like the world was closing in, Omalu quit his job and went into hiding. When the case went to trial, he testified for three excruciating days. Wecht never spoke to Omalu again, even after the trial resulted in a hung jury and the charges were later dismissed.

Omalu eventually landed a job as chief medical examiner in San Joaquin County, California, an agricultural hub about 80 miles east of San Francisco. While Nowinski gained power and recognition through his alliances with Boston University and the *New York Times*, Omalu and his colleagues were scattered around the country. The remnants of

the Omalu Group re-formed as the Brain Injury Research Institute, a generic-sounding name they all vaguely disliked. The group was based in Morgantown, West Virginia, where Bailes continued to work as chairman of the neurosurgery department at West Virginia University. Fitzsimmons was still putting in 16-hour days in his Wheeling firehouse-office. The Brain Injury Research Institute's designated brain chaser became Garrett Webster, operating out of the two-bedroom apartment he once had shared with his dad in Pittsburgh's Moon Township.

There had always been a vampirish quality to the business of CTE. To survive and prosper, the researchers were on a constant search for fresh brains. But with concern about the disease growing, along with opportunities for money and prestige, the competition, now involving two research groups, grew more intense and macabre by the day. On May 25, 2008, another former NFL player died young: Tom McHale, 45, a 6-4, 290-pound offensive guard who had spent nine years in the league before retiring after the 1995 season. He died of a drug overdose. The story was too familiar: A successful restaurateur after his retirement, a Cornell graduate, at the time of his death the once thoughtful and friendly McHale "was very, very different from the guy I married," his wife, Lisa, said. "It was like he was a shell of his former self."

The brilliant smile, the charisma, and the polished presentation all disappeared, replaced by the often vacant and disheveled look of a man who no longer cared. Even more than becoming a football player, McHale had aspired to run his own restaurant. It was his passion, and he loved everything about it, from the cooking to the customers. Then one night, lying in bed, McHale told Lisa, "I'm not enjoying the restaurant business anymore. I think I want to get out." She couldn't believe it. The restaurant was "his baby, his brainchild." Gradually, McHale lost interest in everything. He stopped cooking and no longer went skeet shooting or bike riding. He began to distance himself from the people he loved.

The Omalu Group got to McHale's family first and made its pitch. Then BU stepped in and "convinced the wife to split the brain in two," Bailes informed the group in an e-mail. About a week later, Nowinski called Omalu to suggest that the two groups work together on this case. McKee and Omalu would analyze the tissue and then jointly contact Lisa McHale with the findings before making the announcement together. In